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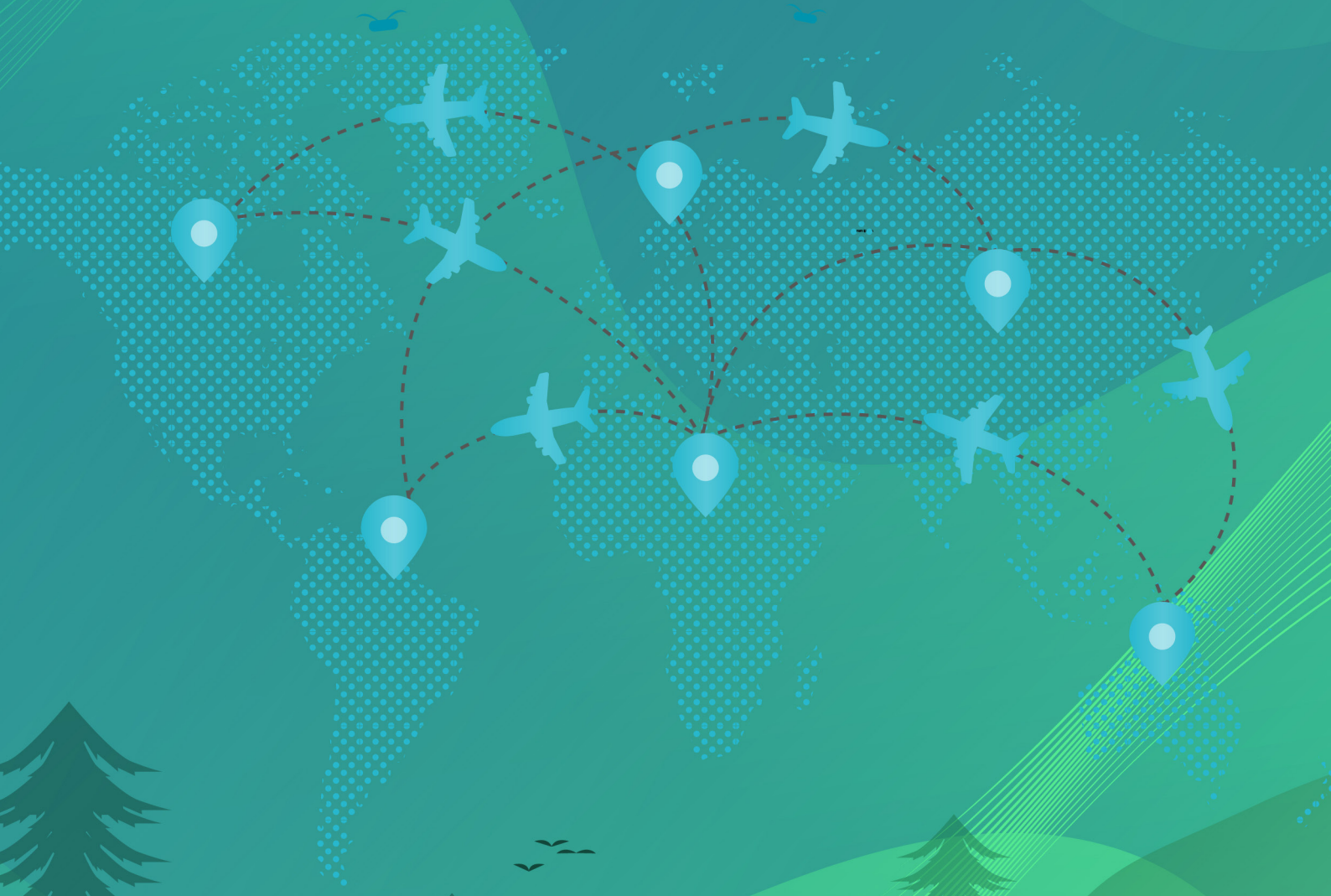

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Acceptability of Cookies with Dioscorea Hispida as Local Pastry

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ABSTRACT

This study evaluates the acceptance of cookies with different flour compositions, with a particular interest in Dioscorea Hispida, commonly known as Nami flour. Five different formulations of cookies varying in their content of all-purpose and Nami flour were rated by 50 local consumers for appearance, taste, crispiness, crumbliness, texture, and aroma. Results indicated that cookies' best appearance and aroma were those containing 75% all-purpose flour and 25% Nami flour. On the other hand, a blend of 75% Nami flour and 25% all-purpose flour achieved the highest ratings in taste, crispiness, and overall acceptability. Such findings show that the addition of Nami flour might have the potential to enhance sensory qualities and consumer satisfaction. The recommendations made in this study are to popularize the use of Nami flour in promoting local agriculture, fine-tuning formulations of products, and innovating new products. Further studies on optimizing flour blending, the potential health benefits of using Nami flour, and standardization of methods for sensory evaluation become imperative.

INTRODUCTION

The human heart is never far from a culinary adventure in search of new and exciting flavors. One of these is the investigation of the root crop Nami, scientifically known as Dioscorea hispida, to produce innovative Nami Cookies. Dioscorea hispida, commonly called Nami, belongs to one of the species of yams that are indigenous in Southeast Asia, although it is widely cultivated in the tropical region. With its characteristic elongated shape, rough texture, and pale flesh, the Nami is valued for culinary and nutritional purposes. It is very low content of fat and cholesterol, combined with complex carbohydrates, high dietary fiber, vitamins, and minerals, makes it a very healthy addition to any diet, providing a good and healthy alternative to other starchy foods. Though it has a few culinary uses, compared to other root crops, it is relatively underutilized. It is locally well known for its toxicity, and the indigenous Mangyan people of Mindoro use Nami as a survival food during times of famine.

Building on this potential food ingredient, the present research aimed to tap Nami's cookies with unique flavors and nutrition benefits as a potential cookie ingredient. One of the goals of this study is to add an exciting new flavor to cookie recipes by introducing Nami while probably raising their nutritional value. Very importantly, among the major targets of SDGs—according to the United Nations Sustainable Development Goals—are such aspects as product development, therefore linking innovation and sustainable practices to the solution for global challenges. SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 12 (Responsible Consumption and Production) bring out the essence of developing new sustainable products that ensure economic growth while ensuring responsible use. Based on these objectives, this study will show the feasibility and acceptability of Dioscorea hispida in cookie formulation, thus opening new avenues for this very nutritious root crop.

The research embarks on an exploration of possibilities with Nami Cookies: To describe them, relating to consumer acceptance and cultural significance. More than that, to understand the culinary traditions associated with Nami to enrich the narrative about this unique ingredient. This study focused on developing Nami Cookies, in which all-purpose flour is replaced by Nami flour. Specifically, it assessed the quality characteristics of Nami Cookies and established the product's acceptability level. The present research thus attempts to add to this effort by investigating the next aspects of Nami's value and versatility as a variety ingredient in modern cuisine, aiming for sustainable development.

LITERATURE REVIEW

Dioscorea Hispida Dennst

Dioscorea hispida Dennst locally known as "karot" or "namiNami" is a nutritious wild yam or root crop that commonly grows in Southeast Asia, particularly in the Philippines. This tuber is widely grown during rainy seasons of June and July which stimulate its growth naturally in the mountainous parts of different regions of the country. The flesh and sap of this tuber is yellowish and contains high level of cyanide. However, in indigenous communities like Mangyans and Ilokanos, this tuber served as their traditional food and substitution for rice after it had undergone detoxification. It is consumed as an important part of their cultural heritage and way of life. The wild yam has multiple detoxification processes, which vary among different places (Raras & Malinnag, 2004; Talbo, 2022).

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Nami is appreciated for its nutritional properties and its cultural impact. It contains high carbohydrates, dietary fibers, vitamins including Vitamin C, and minerals such as potassium and, manganese which are needed to support a person's health and well-being. After detoxification process, Indigenous communities use the crop in culinary by boiling, roasting or grinding Nami into flour. The versatility of the crop makes it an important source of food in the region (Reis *et al.*, 2017).

Cookies Made with Nami

Cookies are small, flat, baked food products that are usually sweet and baked until crispy or they can remain soft and chewy. It is one of the popular pastries served as a treat, widely consumed by individuals from different ages. It is made of flour, butter, and sugar is characterized as a baked product rich in sugar, low moisture content, and high in fat (Xu *et al.*, 2020). A review by Harijono *et al.* (2017) discusses traditional processing methods of wild yam to reduce cyanogenic compounds can improve safe consumption.

Nami flour can be used in composite flour to produce more desirable baked goods, preferably cookies. Composite flour, as defined, is a mixture of flours made from tubers such as cassava, yam, cereals, protein-rich-flour, wheat, and non-wheat flour. As an example, composite flours like Dioscorea hispida flour with wheat (all-purpose flour), wheat with sweet potatoes, wheat and cassava, and other composites can also lessen the dependability of imported flour. This innovation leads to much attention to researchers to develop more products (Hasmadi *et al.*, 2020).

According to the findings of Tsatsaragkou *et al.*, 2014, studies on cookies made from conventional flours such as Nami are limited but promising. Moreover, research has shown that cakes, cookies, sponge cakes, and biscuits can be made with a combination of Nami flour (Estiasih *et al.*, 2022; Jariyah *et al.*, 2024; Compendido & Galvez, 2017; Renate, 2018). The results suggest that pastries made with Nami flour have the potential to become a popular healthy snack.

The use of Nami as a substitute for wheat flour can provide additional health benefits since it is gluten-free and highly acceptable for individuals with celiac disease, diabetes and with dietary restrictions. Since gluten-free foods control rapid increases in blood glucose, this nutritious crop can also be incorpporated to modern diets as it gives essential vitamins and minerals. Additionally, Nami flour can provide a distinctive flavor to cookies and textural qualities, making it more attractive substitution to traditional cookies (Jariyah *et al.*, 2024).

Acceptability and Sensory Test

Processing of underutilized tuber into nutritious snacks indicates a growing interest in research particularly its formulation and consumer acceptance. Research on consumer acceptance of Nami (Dioscorea hispida) in cookie formulations highlights increasing interest in utilizing this underutilized tuber in nutritious snacks. Some studies have concentrated on enhancing both the nutritional content and consumer appeal of Nami cookies (Compendio & Galvez, 2017) by applying a Simplex Lattice Design to enhance protein-enriched Nami cookies using soybean, mung bean, and white bean flours, resulting in cookies with significant protein content. Their study showed that cookies made from Nami flour are safe for consumption after the rendered detoxification process and have an outstanding sensory capability with the potential to compete with commercial cookies.

To further explore the acceptability of a product, the application of sensory analysis is crucial in forming positive expectations. The consumer acceptability test, also called the hedonic or affective test, assesses the degree of liking of a product based on its sensory appeal. It involves the inspection of products using sense of sight, smell, taste and hearing for various quality attributes such as appearance, aroma, taste, flavor and texture. The commonly used method in assessing the acceptability of the product is a hedonic scale where participants indicate how much they like or dislike the samples (Fiorentini *et al.*, 2020).

Appearance is characterized as the first to be perceived by the human senses. It plays a significant role in selecting good quality of food before it touches your lips which is comprised of shape, color, gloss, transparency, and dullness. The appearance of the product should stimulate the appetite, resulting in the product's acceptance. Olakanmi, Jayas, and Paliwal (2022) found that mixing different flours can greatly improve the qualitative characteristics of baked goods. According to their analysis, those mixtures with a higher percentage of wheat flour showed better sensory characteristics, including appearance and consumer acceptance.

Subsequently, taste is a major driver of purchase intention. It is detected by the tongue when food particles are surrounded by saliva. The taste of the cookie produced varies between slightly sweet, moderately sweet, and sweet. In a similar way, unfamiliar and unexpected tastes can indicate a difficulty in accepting a food product.

Aroma is also related to taste since it is perceived by the sensory sense of smell which is detected by the olfactory tissues of the nasal cavity. An aromatic food signifies that it is delicious. The food stuff should be gassy state to activate the sense of smell. Moreover, the aroma is beneficial in perceiving, rancid, poisonous, and fresh food (Sharif *et al.*, n.d.). The study of Jariyah *et al.*, (2024). investigated the impact of different tubers, such as Pedada (Sonneratia caseolaris) and Lindur (Bruguiera gymnorrhiza), on the sensory attributes of biscuits. Their study showed that certain ingredients can have a significant improvement on the aroma profile, leading to greater consumer acceptance. This indicates that the ingredient combinations r aromatic characteristics, increasing the appeal of food products to consumers.

Conclusively, texture is another component of sensory evaluation that are sensed by touch or feel in the mouth

and hands. Texture, as a parameter in sensory evaluation, is associated with liking and disliking a certain crispiness, crumbliness, tenderness, firmness, and chewiness characteristic of a cookie (Rustagi, 2020). Wild yam has a distinctive texture quality. The study of Hamdani *et al.* (2020), reveals that the use of gluten-free flours adds effect like crispiness in making cookies. Given that Nami flour is gluten-free, their results are particularly relevant. They discovered that the incorporation of certain gluten-free flours significantly improved the textural properties of cookies, which was favored by consumers. Similarly, the study of Gagnaten, et al (2023), revealed that a higher amount of gluten-free flour is more resistant to breakage, but the cookie added with fiber showed lower deformation before breakage which corresponds to a more fragile structure, this means with the right amount of combination of the flours can enhanced the crispiness of the cookies that will show in higher acceptability of the product. Additionally, Liu and Zhang (2015) found that consumer preference for crumbliness directly influences satisfaction. Also, the ratio and formulation of ingredients impact cookie texture. Formulations incorporating varying levels of Nami (Dioscorea hispida) flour and all-purpose flour produced textures ranging from soft to crispy. The study revealed that texture acceptability increased as the proportion of all-purpose flour neared 100% and decreased as the amount of Nami flour increased (Compendio & Galvez, 2017). The sensory evaluation of Nami flour as an ingredient of various food products improved texture such as crumbliness, and juiciness, enhancing overall acceptability (De la Rosa & Mabesa, 2023). The adaptation of Nami flour as an ingredient has a considerable impact on the sensory experience and general acceptability of cookies. The study by Hasmadi *et al.*, (2020), revealed that composite flour is a significant part of producing good quality food products in terms of organoleptic properties, appearance, and acceptance from consumers. As such, Nami flour has a suitable characteristic to be included in a composite flour.

The sustainable processing of Nami into cookies are aligned with the growing trend in food innovation. Also, through its promotion, manufacturers can help local farmers especially to those in upland areas preserve and cultivate their traditional root crops.

In general, cookies made with Dioscorea Hispida flour correspond to a new healthy food that has the advantages to attract variety of consumers. It is also suggested that further research into the sensory attributes, nutritional advantage, and consumer acceptance of these cookies can help promote their use and contribute to the enhancement of the food industry.

MATERIALS AND METHODS

In this study, various materials and methods were utilized to develop and assess Nami Cookies using Dioscorea hispida. The core ingredients included Dioscorea hispida flour, all-purpose flour, granulated sugar, baking soda, salt, margarine, lard, eggs, and vanilla extract. Essential kitchen equipment, such as measuring cups, spoons, a grinder, sifter, mixing bowls, baking pans, and an oven, were employed, with all tools meticulously cleaned before use.

The preparation of Nami flour involved washing, peeling, slicing, soaking, sun-drying, and grinding the tubers. The resulting flour was sifted and stored in airtight containers. Five cookie variants were developed for testing:

Table 1: Ingredient Composition for Different Flour Treatments

Treatment No.	All-Purpose Flour	Dioscorea Hispida Flour	Baking Soda	Salt	Margarine (Softened)	Lard (Softened)	Granulated Sugar	Eggs (large)
1.100% all-purpose flour	300 grams	0	2 grams	2 grams	70 grams	100 grams	200 grams	2
2.100% Nami flour	0	240 grams	2 grams	2 grams	70 grams	100 grams	200 grams	2
3.50% Nami flour and 50% all-purpose flour	150 grams	150 grams	2 grams	2 grams	70 grams	100 grams	200 grams	2
4.(75% Nami flour and 25% all-purpose flour	188 grams	63 grams	2 grams	2 grams	70 grams	100 grams	200 grams	2
5.75% all-purpose flour and 25% Nami flour	225	75 grams	2 grams	2 grams	70 grams	100 grams	200 grams	2

Cookies were prepared following the recipes in Table 1. The sifted Nami flour, baking soda, and salt were combined in one bowl, while lard and margarine were creamed together with sugar in another bowl. Beaten eggs were added one at a time, and then the dry ingredients were gradually mixed with the wet ingredients until the dough was light and smooth. The dough was chilled in the freezer for at least 30 minutes, then portioned, shaped, and baked at 180°C for about 20 minutes or until golden. To obtain reliable results in the evaluation of the cookie samples, sensory evaluation and acceptability tests were conducted. A total of 50 respondents, including students, faculty, staff, and community members from Bongabong, participated in the testing. The sensory evaluation assessed attributes such as color, taste, crispness, crumbliness, texture, and aroma using a scale from 1 to 4. The data

were analyzed using descriptive statistics to summarize preferences and percentages.

Ethical considerations were upheld by obtaining written consent from participants, ensuring confidentiality, and providing the opportunity to review and confirm responses. No adverse reactions were reported after consuming the cookies, indicating their safety for consumption. All findings were compiled into a comprehensive report detailing key insights into consumer opinions, preferences, and behaviors regarding Nami Cookies.

RESULTS AND DISCUSSION

The results of the study conducted are presented in tabular form with the corresponding textual interpretation.

Table 2: Level of Acceptability in Terms of Appearance

Treatment No.	Mean	Rank	Quality Description
1	3.18	4	Like Slightly
2	3.12	5	Like Slightly
3	3.28	3	Like Slightly
4	3.62	2	Like Very much
5	3.70	1	Like Very much
Total	**3.38**		**Like Slightly**

Table 2 shows that treatment No. 5, which contains 75% all-purpose flour and 25% Dioscorea Hispida (Nami) flour, has the highest mean score for acceptability regarding appearance of 3.70, which is interpreted as "liked very much," and occupies a place of first. Whereas the treatment No. 2, having 100% Dioscorea Hispida flour yielded the lowest mean score of 3.12 and the place of fifth, so it was placed at "liked slightly." Treatment No. 4 prepared with 75% Dioscorea Hispida flour and 25% all-purpose flour also resulted in high acceptability second, with a score of 3.62. Treatment No. 3, with a 50/50 blend of the two flours, scored a middle-of-the-road 3.28 for third place, and Treatment No. 1, using 100% all-purpose flour, scored 3.18, fourth place.

In general, treatment made up of two flours was most preferred, with the higher percentage of All-purpose flour in the mixture showing a significantly higher preference for the cookies.

Supporting these findings, Olakanmi, Jayas, and Paliwal (2022) found that mixing different flours can greatly improve the qualitative characteristics of baked goods. According to their analysis, those mixtures with a higher percentage of wheat flour showed better sensory characteristics, including appearance and consumer acceptance. This relates to treatment no. 4 which has 75% all-purpose flour with 25% Nami (Dioscorea Hispida dennst.) flour mixture resulting in a more refined cookie appearance.

Table 3: Level of Acceptability in Terms of Taste

Treatment No.	Mean	Rank	Quality Description
1	2.80	5	Dislike Slightly
2	3.30	3	Like Slightly
3	3.38	2	Like Slightly
4	3.78	1	Like Very much
5	3.26	4	Like Slightly
Total	**3.30**		**Like Slightly**

The above table shows that treatment No. 4 got the highest mean score for taste with 3.78, ranked first, and the degree described as "liked very much." The lowest mean score was attained by Treatment No. 1, having 2.80, ranked fifth, and the degree described as "disliked slightly." Treatments No. 3, with 3.38; No. 2, with 3.30; and No. 5, with 3.26, all ranked second, third, and fourth, respectively, best described as "liked slightly.". Overall, treatment number 4 was the most favored in terms of taste. According to the results, specific ingredient combinations impact the taste preferences of the participants.

This is supported by the study of Renate (2018), which reveals that the combination of 75% Gadung (Dioscorea Hispida Dennst) flour used as an ingredient in sponge cake resulted in a good taste. This suggests that Nami flour has desirable taste characteristics.

Table 4: Level of Acceptability in Terms of Crispiness

Treatment No.	Mean	Rank	Quality Description
1	3.02	5	Like Slightly
2	3.18	4	Like Slightly
3	3.40	2	Like Slightly
4	3.62	1	Like Very much
5	3.20	3	Like Slightly
Total	**3.28**		**Like Slightly**

Specifically, Table 4 shows that Treatment No. 4 was perceived to be much crispier than the rest, for the same was rated as "Like Very Much" with a mean score of 3.62. Treatments 1, 2, 3, and 5 recorded a more moderate rating of "Like Slightly," with their corresponding mean scores ranging from 3.02 to 3.20. The overall mean acceptability for crispiness across all treatments was "Like Slightly" with a mean score of 3.28. Based on these results, it can be inferred that specific conditions or components of Treatment No. 4, therefore, increase crispiness to a greater extent, which might form a desirable attribute in the consumer's mind.

To support this finding, the study of Hamdani *et al.* (2020), reveals that the use of gluten-free flour adds an effect like crispiness in making cookies. Given that Nami flour is gluten-free, their results are particularly relevant. They discovered that the incorporation of certain gluten-free flours significantly improved the textural properties of cookies, which consumers favored. Similarly, the study of Gagnaten, et al (2023), revealed that a higher amount of gluten-free flour is more resistant to breakage, but the

cookie added with fiber showed lower deformation before breakage which corresponds to a more fragile structure, this means with the right amount of combination of the flours can enhanced the crispiness of the cookies that will show in higher acceptability of the product.

Table 5 Acceptability Level for Cookie Crumbliness

Table 5: Level of Acceptability in Terms of Crumbliness

Treatment No.	Mean	Rank	Quality Description
1	2.86	4	Like Slightly
2	3.00	5	Like Slightly
3	3.32	3	Like Slightly
4	3.60	2	Like Very much
5	3.72	1	Like very much
Total	**3.3**		**Like Slightly**

across Five Different Treatments in Table 5, treatments 4 and 5 were perceived to be far crunchier than the other treatments; both scored "Like Very Much" ratings to be in the top two positions, while treatments 1, 2, and 3 gained a "Like Slightly" rating for crumbliness. The general average in the acceptability of crumbliness was "Like Slightly" with an average score of 3.3. Well, these findings suggest that it is something in the specific formulation or the processing method of Treatments 4 and 5 that gives them a greater degree of crumbliness, so a quality that consumers who like crumbly cookies would find desirable.

Liu and Zhang (2015) found that consumer preference for crumbliness directly influences satisfaction, corroborating the higher acceptance of crumbliness in Treatments 4 and 5 in this study. Also, the ratio and formulation of ingredients impact cookie texture. These findings collectively affirm that both formulation or processing methods play crucial roles in achieving desirable cookie crumbliness.

Table 6 Acceptability level of the five treatments on

Table 6: Level of Acceptability in Terms of Texture

Treatment No.	Mean	Rank	Quality Description
1	3.08	4	Like Slightly
2	2.98	5	Like Slightly
3	3.46	3	Like Verymuch
4	3.76	1	Like Very much
5	3.68	2	Like Verymuch
Total	**3.39**		**Like Slightly**

texture. Treatments 4 and 5 are perceived to have the most desirable texture, rated as "Like Very Much" with mean scores of 3.76 and 3.68, respectively. Table 6 Texture acceptability for five treatments. The treatment most favored is Treatment 4, with a mean score of 3.76, which falls in the category "Like Very Much." Following it very closely is Treatment 5 at a mean of 3.68, also falling in the category "Like Very Much." Treatment 3 did well, coming in with a score of 3.46. In contrast, Treatments 1 and 2 have scores of 3.08 and 2.98, rated as "Like Slightly," respectively. Overall, the mean score was 3.39, indicating that generally, textures were only mildly preferred.

The study by Compendio and Galvez (2017) demonstrated that cookie formulations incorporating varying levels of Nami (Dioscorea hispida) flour and all-purpose flour produced textures ranging from soft to crispy. Their research revealed that texture acceptability increased as the proportion of all-purpose flour neared 100% and decreased as the amount of Nami flour increased.

From these results, Treatments 4 and 5 have more preferred textures, so teasing out what makes them such would be useful in refining cookie production for consumer acceptance.

Table 7 shows the acceptability level on aroma for five

Table 7: Level of Acceptability in Terms of Aroma

Treatment No.	Mean	Rank	Quality Description
1	2.86	5	Like Slightly
2	2.98	3.5	Like Slightly
3	2.98	3.5	Like Slightly
4	3.50	2	Like Very much
5	3.58	1	Like Very much
Total	**3.18**		**Like Slightly**

treatments. Treatment 5 has the highest mean score of 3.58, so it is most preferred and is categorized as "Like Very Much." Next came treatment 4 with a mean score of 3.50 in the range of "Like Very Much.". Treatments 2 and 3 were the same, 2.98, which is rated "Like Slightly." The lowest mean rating belonged to treatment 1 at 2.86, also categorized as "Like Slightly." In all, the overall mean score is 3.18, indicating a general mild preference for the aroma across treatments.

These results indicate that Treatments 5 and 4 are more positively perceived with respect to aroma, and therefore their respective formulations or process methods are more likely to yield more desirable aroma characteristics. This would mean that if more attention is given to the aroma profiling of these treatments, satisfaction can be increased among the consumers.

The study by Jariyah, Sarofa, and Setiyawati (2024) supported this finding finding by investigating the impact of different tubers, such as Pedada (Sonneratia caseolaris) and Lindur (Bruguiera gymnorrhiza), on the sensory attributes of biscuits. Their study showed that certain ingredients can can significantly improve on the aroma profile, leading to greater consumer acceptance. This indicates that the particular ingredient combinations in Treatments 5 and 4 likely boost their aromatic characteristics, increasing their appeal to consumers.

Table 8 presents the analysis of the general acceptability

Table 8: Level of General Acceptability

Treatment No.	Mean	Rank	Quality Description
1	2.88	5	Like Slightly
2	3.04	4	Like Slightly
3	3.54	3	Like Very much
4	3.82	1	Like Very much
5	3.70	2	Like Very much
Total	**3.40**		**Like Slightly**

of the five treatments. Treatment 4 had the highest mean score of 3.82 in the "Like Very Much" category and becomes the most favored overall. This was followed by treatment 5 with a mean score of 3.70, which was also rated as "Like Very Much." Treatment 3 had a mean score of 3.54, which was highly regarded. Treatments 2 and 1 have mean scores of 3.04 and 2.88, respectively, both categorized as "Like Slightly." The general average of 3.40 shows a slight inclination toward the treatments in general.

The results show Treatments 4 and 5 to be most acceptable overall, thus likely to provide the most balanced and most appealing set of attributes across the board. It simply means that these treatments would be consumer favorites since they have superior qualities.

To support the findings, some studies have shown that ingredient adaptations can have a considerable impact on the sensory experience and general acceptability of cookies. Research on alternate flours and unusual chemical combinations in cookie formulas yields useful information. For example, a study on cookies enhanced with xiquexique (Pilosocereus gounellei) flour found that certain component mixtures improved nutritional and sensory properties, resulting in increased consumer acceptance (de Silva *et al.*, 2021). These findings highlight the importance of ingredient selection and formulation in creating healthful cookies that are also appealing to consumers.

Treatment 4's unique combination of 75% Nami flour and 25% all-purpose flour is probably attributed to its enhanced sensory characteristics and overall acceptance. This is consistent with the findings of the aforementioned research, which show that carefully selected and balanced ingredient combinations can greatly improve the sensory properties and overall appeal of cookies.

Table 9 summarizes the degree of acceptability for the five

Table 9: Summary Table on the Level of Acceptability

Treatment	Appearance	Taste	Crispiness	Crumbliness	Texture	Aroma	General acceptability	Average	Rank	Quality description
1	3.18	2.80	3.02	2.86	3.08	2.86	2.88	2.95	5	Like Slightly
2	3.12	3.30	3.18	3.00	2.98	2.98	3.04	3.09	4	Like Slightly
3	3.28	3.38	3.40	3.32	3.46	2.98	3.54	3.34	3	Like Slightly
4	3.62	3.78	3.62	3.60	3.76	3.50	3.82	3.67	1	Like Very Much
5	3.70	3.26	3.20	3.72	3.68	3.58	3.70	3.55	2	Like Very Much

treatments across multiple attributes. Treatment 4 had the highest average score of 3.67, rated as "Like Very Much," followed by Treatment 5, which had an average score of 3.55, also rated as "Like Very Much.". Ranking third, with an average score of 3.34, was Treatment 3. Descriptive words include "Like Slightly." Both Treatments 2 and 1, with average scores of 3.09 and 2.95 respectively, are rated as "Like Slightly."

The results show that, all in all, treatment 4 has the best combination of attributes, since it is most preferred. Treatment 5 was also well-accepted but less preferred. Treatments 1 and 2 may need improvements to increase their acceptability.

According to Pagatpatan *et al.* (2017) in their study on the "Acceptability of Palawan Sesame as a Local Delicacy," the results revealed that a composition of 75% Palawan flour (swamp taro flour) and 25% all-purpose flour had very good acceptability. Likewise, similar ratio of treatments was highly rated in terms of color, texture, aroma and taste and highly acceptable. Furthermore, the study of Hasmadi *et al.*, 2020, revealed that composite flour is a significant part of producing good quality food products in terms of organoleptic properties, appearance, and acceptance from consumers. These studies supported the results as shown above.

CONCLUSION

The study concludes that Treatment 4, with its 75% Nami flour and 25% all-purpose flour, was the best in terms of taste, crispiness, and texture, and overall acceptability. In Treatment 5, with 75% all-purpose flour and 25% Nami flour, the cookies appeared better in terms of appearance and had better crumbling characteristics. In general, it could be stated that the addition of Nami flour improves cookie attributes. Treatments 1 and 2, which did not have added Nami flour, recorded lower scores and therefore would need further adjustments. This implies that combining Nami flour with all-purpose flour greatly improves cookie quality.

RECOMMENDATIONS

In view of the findings of this study, the following recommendations are offered:

Communities Locally

Engage the value the value addition of Nami flour into local foodstuffs to enhance agriculture and improve economic opportunities. Sensitize the benefit and uses of the Nami flour through the community during workshops and other events. The work with artisans in creating new recipes not only enhances local cuisine but encourages innovation at a local level, promoting entrepreneurship and economic growth.

Food Industry

It should include value-added flour blends like 75% all-purpose and 25% Nami flour to be added to their products to enhance quality. They can work more on product formula refinement according to the sensory attributes derived from this study to improve the overall acceptability of the product. The promotion and inclusion of such indigenous ingredients as Nami flour will not only bring novelty in terms of products but will also help in the growth of local agriculture and provide a distinct identity to the offered products.

Consumers

Products with excellence in sensory attributes such as appearance, taste, and so on, to help in satisfying consumers, should be at the center of consumer passion. Promotion of local and indigenous ingredients, such as Nami flour, ensures sustainable agriculture with regard to environmental conservation and building of local economies. Moreover, constructive feedback will help manufacturers to further refine the quality of the products to suit consumer preference.

Researchers and Academics

The researchers and academics should channel their efforts into further studies to improve upon the ingredient combinations and the processing techniques. Much research on the health benefits of such local ingredients as Nami flour will be lucrative in giving such ingredients' nutritional advantages. Moreover, standardizing the methods for assessing food sensory attributes will ensure consistency and reliability in the delivery of research findings.

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